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[54] Title: CHEWING GUM PRODUCTION METHOD

[57] Abstract:

**Structure:** Characterized by the fact that an extract produced by extracting tea, coffee, cocoa or the like with a solution containing over 70 wt% of (A) a high-molecular polysaccharide with DE 25-50 and/or (B) a solution of less than 5 wt% viscosity-building polysaccharide is mixed with chewing gum components.

**Results:** A chewing gum is proposed which has a pleasant flavor originating in highly flavored substances such as Japanese tea, red tea, coffee, cocoa or the like, and retains the mouthfeel of chewing gum.

#### Claims

1. Chewing gum manufacturing method, characterized by the fact that an extract liquid obtained by extracting the active components from highly flavored materials using (A) a solution containing 70 wt% or more of a high-molecular polysaccharide with DE 25-50 and/or (B) a solution containing 5 wt% or less of a viscosity-building polysaccharide is/are mixed with chewing gum components.

**Detailed Explanation of the Invention****0001****Field of Industrial Application**

The invention relates to a manufacturing method for a chewing gum that has a pleasant flavor originating in a highly flavored material such as Japanese tea, red tea, coffee, cocoa and the like and maintains the mouthfeel of chewing gum.

**0002**

Generally, chewing gum flavoring containing flavors from highly flavored substances such as red tea, green tea, coffee and the like is accomplished using aromas. However, the use of aromas alone produces an artificial taste, which is liable to deviate from the actual flavor of the original substance. Thus, in addition to the above-specified aroma, extracts, pastes and the like of the highly flavored substance are used. However, these extracts, pastes and the like lose the original flavor of the highly flavored substance because of the thermal history during processes such as concentration and sterilization, and the flavor and aroma are readily altered. Further, chewing gum with extract and paste added is prone to deterioration of mouthfeel, and these materials cannot be used in large amounts.

**0003**

Flavorings made by powdering highly flavored substances in the unaltered state without extract or paste added are also added to chewing gum. However, when highly flavored material is powdered by this method, even though the preferred flavor of the original highly flavored substance is preserved, the grains of powder become gritty and the mouthfeel deteriorates. Further, when ground coffee beans, for example, are added to chewing gum, the coffee grounds become part of the chewing gum bolus when the gum is chewed, impairing the cohesion of the chewing gum in the mouth, softening the chewing gum and producing the sensation that the gum is melting in the mouth. Other methods that may be contemplated include painting a powder made from highly flavored material on the chewing gum surface rather than kneading it into the chewing gum. In this method, however, only a small amount can be applied, and the flavor is weak and short-lived, being perceived only at the start of chewing. Further, the flavor components readily dissipate in the air from the chewing gum surface. As stated above, chewing gum with original highly flavored ingredients are lacking in the flavor of these ingredients and also have unsatisfactory mouthfeel.

**0004****Problems to be Solved by the Invention**

In view of this situation, the inventors conducted intensive research. Thus, as a result of research aimed at developing a solvent that would extract highly flavored materials, they found that, by adding to chewing gum either a solvent obtained using high-molecular polysaccharides or a solvent obtained using specific viscosity-building polysaccharides, the chewing gum obtained has the flavor of the original highly-flavored ingredients, retains the tack of chewing gum and retains a good mouthfeel. The invention is based on this discovery. The goal of the invention is to propose a method of manufacturing a chewing gum that has a good flavor originating from highly flavored ingredients and maintains the mouthfeel of chewing gum.

0005

**Means of Solving the Problem**

The above-stated goal is achieved by a chewing gum manufacturing method characterized by the fact that an extract produced by extracting tea, coffee, cocoa or the like with a solution containing over 70 wt% of (A) a high-molecular polysaccharide with DE 25-50 and/or (B) a solution of less than 5 wt% viscosity-building polysaccharide is mixed with chewing gum components.

0006

The invention is described in detail in the following. First, the highly flavored ingredient used in the invention can be any suitable ingredient that satisfies the purpose of the invention, such as green tea, red tea or oolong tea leaves, coffee beans, cocoa beans or the like. When tea leaves are used as the highly flavored ingredient, the extracted components do not affect the gum base, and the results of the invention can be achieved. When coffee, cocoa or other beans are used, they can be properly roasted and either used without further processing or ground before use. In particular, the use of roasted beans without further processing is appropriate because it does not influence the mouthfeel of the chewing gum.

0007

The solution for extracting the highly flavored ingredients is the aforementioned (A) and/or (B). (A) is a solution containing 70% or more of high-molecular polysaccharide with DE 25-50, calculated as against solids.<sup>1</sup> High-molecular polysaccharides with DE 25-50 include starch syrup and reduced starch syrup, which can be used alone or in combination. The DE must be adjusted to within the above range of 25-50. If the DE falls below 25, the viscosity during extraction is too high, impairing the extraction efficiency, and when this flavoring is added to the chewing gum, the mouthfeel becomes hard. However, when the DE exceeds 50, the chewing gum becomes sticky and the mouthfeel becomes too hard when the material is added to chewing gum.

0008

The concentration of the aforementioned high-molecular polysaccharides in solution (A) is set at 70% or more as against solids. When the concentration falls short of 70%, if the amount to be added to the chewing gum increases, the moisture level of the chewing gum becomes excessive, and an appropriate texture is not obtained. When extraction is done in an open extraction apparatus with stirring and heating, the aroma components are instantly extracted.

0009

(B) is a solution containing 5% or less of a viscosity-building polysaccharide. Examples of such viscosity-building polysaccharides are natural gums such as xanthan gum, gum arabic, carrageenan, pectin, pullulan, locust bean gum, guar gum, tamarind gum and curdlan. Of these, gums of vegetable origin such as xanthan gum and gum arabic and viscous substances secreted by microorganisms are appropriate from the standpoint of maintaining the mouthfeel of chewing gum. In solution (B), the concentration of the viscosity-building polysaccharide is set at 5% or less,

<sup>1</sup> The term "as against solids" was omitted in the abstract and claims.—Tr.

preferably 2.5-4%. If the concentration exceeds 5%, the viscosity of the solution increases and the extraction efficiency drops.

#### 0010

The inventive method of manufacturing chewing gum containing highly flavored ingredients using the above-mentioned highly flavored ingredients plus (A) and/or (B) is conducted, for example, as follows. The active components are extracted from the highly flavored substances using (A) or (B). (A) or (B) can be used alone or both can be used in combination. The extraction efficiency is better if (A) is used. The extraction temperature and time are set according to the type of highly flavored material. For example, in the case of green tea, the extraction time is generally 2-36 hr at 10-70°C. As for the ratio of highly flavored substance to (A) and/or (B), the best results in terms of flavor and extraction efficiency are obtained at proportions of highly flavored material in the range of 1-50, preferably 10-30, parts per 100 parts water in the extraction solution.

#### 0011

Any extraction equipment conventionally used for coffee, red tea and the like is acceptable. Particularly good extraction efficiency is obtained using extractors equipped with stirrers and extractors that can be sealed.

#### 0012

When extraction is done with the air in the extraction solution replaced with inert gases such as nitrogen, the process is particularly suitable in terms of flavor retention. When nitrogen gas is used, for example, it can appropriately be bubbled into the extraction solvent at the rate of 0.1-10 liters per 1000 liters of extraction solvent per minute.

#### 0013

When extraction is completed, the spent extracted material such as tea leaves or coffee grounds is appropriately filtered off. The concentration of the extract from the highly flavored material in the extract obtained in this way is 1-3%. The liquid extract obtained as above is then mixed with chewing gum ingredients and the inventive chewing gum is obtained by a conventional method.

#### 0014

These chewing gum ingredients are not particularly limited. Conventional gum base, sweeteners, aromas, coloring agents, flavors and other ingredients can be appropriately combined and used.

#### 0015

In the case of a liquid extract using (A), the amount of liquid extract added should be in the range of 5-15% as against total chewing gum weight. When (B) is used in the extraction liquid, 1-2.5% should be added as against total chewing gum weight. When the total amount added falls below the above-specified respective ranges, the targeted pleasant flavor tends not to develop. On the other hand, if these ranges are exceeded, the chewing gum becomes pasty and the gum feels as though it is melting in the mouth during chewing.

0016

**Effects of the Invention**

As stated above, with the inventive method of manufacturing chewing gum containing highly flavored ingredients, by extracting the active components from the highly flavored materials using specific solutions, the mouthfeel of chewing gum is retained even when the resulting liquid extract is added to chewing gum. Further, the thermal history of the liquid extract obtained is minimal because there is no need to concentrate or sterilize the liquid extract from the highly flavored material. Thus, the chewing gum has the flavor of the original highly flavored substance. Further, the strength of the flavor can be adjusted at will by varying the extraction conditions during the extraction process.

0017

The invention is explained in detail in the following on the basis of embodiments.

**Embodiments 1-10, Reference Examples 1-4**

Under the conditions specified in Tables 1 and 2, a liquid extract was prepared from highly flavored material in a sealed vessel with stirring. A stick chewing gum with dimensions of 72 x 19 x 1.9 mm, weighing 3.0 g per stick, was prepared by kneading the various chewing gum components in the composition shown in Tables 3 and 4.

0018

**Reference Example 5**

A chewing gum was prepared in the same way as Embodiment 1 as shown in Table 4 except that medium-grade green tea extract was used instead of the liquid extract.

0019

**Embodiment 11**

Chewing gum was prepared in the same way as Embodiment 1 except that the highly flavored substance was extracted in an open vessel with stirring. The soluble solid content of the liquid extract was 2.6%.

0020

**Embodiment 12**

Highly flavored material was extracted in a stirred sealed vessel. During this time, with the seal in place, nitrogen gas was bubbled through at the rate of 0.25 liters per 1000 liters of extraction solvent. With this exception, the chewing gum was prepared as per Embodiment 1. The solids content of the liquid extract was 2.6%. The mouthfeel and flavor of the chewing gums of the above-cited Embodiments and Reference Examples were rated organoleptically by an expert panel of 10. The results are shown in Tables 3 and 4.

0021

Table 1

		Extraction Solvent							Ennodiments						
		1	2	3	4	5	6	7	8	9					
(A)	starch syrup (B x 70) DE40	100	—	—	—	100	100	100	100	100					
	starch syrup (B x 85) DE40	—	100	—	—	—	—	—	—	—					
	water	—	—	—	—	—	—	—	—	—					
	concentration of the solution (%)	70	85	—	—	70	70	70	70	70					
(B)	xanthan gum	—	—	3	—	—	—	—	—	—					
	gum arabic	—	—	—	5	—	—	—	—	—					
	water	—	—	97	95	—	—	—	—	—					
	concentration of the solution (%)	—	—	3	5	—	—	—	—	—					
highly flavored material		medium- grade green tea													
extraction rate (extraction solvent/water content: highly flavored material)		100:20	100:20	100:20	100:20	100:1	100:50	100:1	100:50	100:1	100:50	100:20	100:50	100:50	100:20
extraction temperature (°C)		50	50	50	50	50	50	50	50	50	50	50	50	50	50
extraction time (hr)		18	18	18	18	18	18	18	18	18	18	18	18	18	18
soluble solids content of the tea components (°) [sic]		2.0	1.8	1.5	1.2	0.9	2.4	0.7	2.0	1.9					

0022

Table 2

		Embodiments		
		1	2	3
(A)	starch syrup (B×70) DE40	86	—	—
	starch syrup (B×85) DE40	—	—	—
	starch syrup (B×70) DE20	—	—	100
	starch syrup (B×70) DE60	—	—	—
	water	14	—	—
(B)	concentration of the solution (%)	60	—	70
	xanthan gum	—	7	—
	gum arabic	—	—	—
	water	—	93	—
	concentration of the solution (%)	—	7	—
highly flavored material		medium-grade green tea	medium-grade green tea	medium-grade green tea
Extraction conditions	extraction rate (extraction solvent water content: highly flavored material)	100:20	100:20	100:20
	extraction temperature (°C)	50	50	50
	extraction time (hr)	18	18	18
	soluble solids content of the tea components (° ) [sic]	2.2	1.7	1.3
				2.0

0023

Table 3

	Embodyments									
	1	2	3	4	5	6	7	8	9	10
gum base	20	20	20	20	20	20	20	20	20	20
powdered sugar	72.5	65.9	77.1	76.6	72.5	72.5	72.5	72.5	72.5	69.2
starch syrup (B X70) DE40	—	—	—	—	—	—	—	—	—	—
flavor	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
liquid extract	6.7	13.3	2.1	2.1	6.7	6.7	6.7	6.7	6.7	*1 10
powdered medium-grade tea extract	—	—	—	—	—	—	—	—	—	—
moisture	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0
mouthfeel *2	●	●	○	○	●	●	●	●	○	slight melting in the mouth
Evaluation *3	Flavor *3	8.2	8.6	6.3	6.0	6.7	8.6	6.4	8.4	8.6

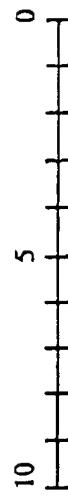
\*1 The liquid extract of Embodiment 1 was used.

\*2 ○: good ●: fair △: poor

\*3 rating

good

inferior



0024

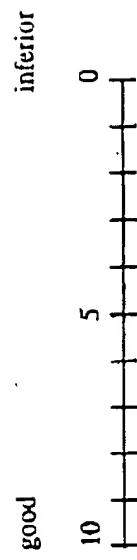
Table 4

		Embodiments				Reference Example	
		11	12	1	2	3	4
Composition (wt%)	gum base	20	20	20	20	20	20
	powdered sugar	72.5	72.5	74.2	77.1	72.5	72.0
	starch syrup (Bx70) DE40	—	—	—	—	—	6.7
	flavor	0.8	0.8	0.8	0.8	0.8	0.8
	liquid extract	*16.7	*16.7	5.0	2.1	6.7	—
	powdered medium- grade tea extract	—	—	—	—	—	0.5
	moisture	2.0	2.0	2.0	2.0	2.0	2.0
Evaluation	mouthfeel *2	•	•	Δ	O	Δ	Δ
	flavor *3	7.2	slightly astringent, weak flavor	9.5	8.3	5.6	6.1
					very weak	somewhat weak	8.1
						5.0	

\*1 The liquid extract of Embodiment 1 was used.

\*2 •: good O: fair Δ: poor

\*3 rating



**0025**

The above-listed results show that the embodied chewing gums all had good mouthful and flavor. By contrast, the reference chewing gums had poor flavor and mouthfeel.

**0026****Embodiment 13**

A chewing gum was obtained according to Embodiment 8 except that roasted coffee beans (unground) were used as the highly flavored material. The chewing gum obtained contained a large amount of coffee flavor components and the flavor was perceived at the start of chewing.

**0027****Embodiment 14**

The chewing gum was obtained according to Embodiment 8 except that roasted cocoa beans (unground) were used as the highly flavored material. The chewing gum obtained had a fragrant roasted flavor of freshly roasted cocoa beans, and the chewing gum had a cocoa flavor in which the characteristic bitterness was perceived instantly.